Plankton sampling by the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean in the austral summer of 2012/2013

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1. Introduction

The training vessel (T/V) *Umitaka-maru* II of the Tokyo University of Fisheries (currently Tokyo University of Marine Science and Technology [TUMSAT]) participated in the first Japanese Antarctic Research Expedition (JARE-1) as the ship associated with the icebreaker *Soya*. Research voyages for marine science in the Southern Ocean have been intermittently taken over by T/V *Umitaka-maru* III and IV (the present ship). After many years of a collaborative relationship, the National Institute of Polar Research (NIPR) and TUMSAT signed a comprehensive cooperation agreement on 9 February 2009.

With the start of the six-year plan for JARE phase VIII by NIPR (2010–2015) came the three-year (2010–2012) TUMSAT-NIPR joint program on “Studies on plankton community structure and environment parameters in the Southern Ocean.” This program focused on the spatio-temporal variation in plankton distribution in the Southern Ocean ecosystem as one of the JARE projects (Project no. AP-25; Prof. Takashi Ishimaru, TUMSAT, principal investigator).

The present report describes the data from the third year research cruise conducted by T/V *Umitaka-maru* IV under the mission of the AP-25 project. This report contains information about the samples collected using five kinds of plankton nets—the Intelligent Operative Net Sampling System (IONESS), Rectangular Midwater Trawl (RMT), Ocean Research Institute (ORI) net, twin North Pacific (NORPAC) standard net and closing net—along longitudes 110°E off Wilkes Land, Antarctica, during the cruise period between 31 December 2012 and 24 January 2013.

2. Cruise number

Data covered in this report were obtained from the 16th *Kaiyodai* (abbreviated Japanese name for TUMSAT) Antarctic Research Expedition (*K*ARE-16) cruise by T/V *Umitaka-maru*, which was conducted as part of the 54th Japanese Antarctic Research Expedition (JARE-54) program. This cruise also served as a leg of the long-distance voyage for the Advanced Course of Marine Science and Technology of TUMSAT (voyage number UM-12-08).

3. Sampling protocol

(1) IONESS

The IONESS is a multiple-net opening and closing zooplankton sampler (Kitamura *et al*., 2001). IONESS was equipped with nine nets with 335-μm mesh for catching meso- to macro-zooplankton.

IONESS was deployed from the stern of vessel and towed obliquely over predetermined depth intervals. Each of the nets was opened and closed sequentially by commands transmitted from an onboard deck unit through an armored cable to an underwater unit. A deployment consisted of the oblique down-cast from the surface to the maximum depth; the opening and closing sequences through specific depth strata occurred during the up-cast.

IONESS sampling was carried out at three stations. The sampling series were conducted twice a day and night at each station. Two series of oblique hauls were conducted at each sampling series: a shallow cast from 400 m to surface depth and a deep cast from 1500 m to 400 m, respectively. Each sampling series was completed usually within 6 hours.

Although there was a flow-meter (Tsurumi-Seiki Kosakusho Co., Ltd., Yokohama, Japan)

mounted outside the net-mouth opening to estimate towing distance, it was not used during this cruise because of a problem with the reliability of the flow-meter rotation due to rough sea conditions. In the present report, therefore, the volumes of water filtered (V, m^3) by each net were estimated with the following equation, assuming filtration efficiencies of 100%:

$$V = D \times A, \quad (1)$$

where D and A are towing distance (m) and mean working filtration area (m^2), respectively. D was calculated as:

$$D = \sqrt{D_h^2 + D_v^2}, \quad (2)$$

where D_h (m) and D_v (m) are the horizontal distance (towing time [s] multiplied by the ship speed [1.0 m s^{-1}]) and vertical distance, respectively. A was calculated as:

$$A = a \times \sin(\pi \times R/180), \quad (3)$$

where a is the mouth area of the net (1.44 m^2 [1.44 m high × 1.0 m wide]) and R is the mean frame angle during each net tow, calculated using the frame angle recorded every 2 s. Depth, temperature and salinity were also measured by a conductivity-temperature-depth (CTD) probe (MicroCAT, Sea-Bird Electronics, Inc., Bellevue, WA, USA) mounted on the net frame. CTD data were recorded in real-time by an onboard computer.

Three stations were occupied along 110°E for IONESS samplings (Fig. 1). Detailed sampling information for the six tows is given in Table 1.

(2) RMT 1+8

The RMT 1+8 is a multiple-net opening and closing zooplankton sampler (Baker *et al.*, 1973).

An RMT 1+8 consists of two rectangular net systems that open and close simultaneously: an RMT-8 (mouth area, 8 m^2; mesh size, 4.5 mm) and an RMT-1 (mouth area, 1 m^2; mesh size, 335 µm).

The RMT 1+8 was operated in a manner similar to the IONESS; it was deployed from the stern of the vessel and towed obliquely with the nets sampling over predetermined depth intervals. The nets were opened and closed sequentially by commands transmitted from the surface deck unit through a single conducting cable to the underwater unit.

Generally, two series of oblique samplings were conducted at each station: a shallow cast down to 200 m depth and a deep cast below 200 m. A full set of samples could usually be collected within 6 h.

The RMT 1+8 was equipped with a calibrated flow-meter (Tsurumi-Seiki Kosakusho Co., Ltd.). The volume of water filtered was calculated according to the formula in the RMT 1+8 instruction manual as a function of the mouth area of the net perpendicular to the axis of flow and the towing distance indicated by the flow-meter. The average trawling speed was approximately 1.0 m s^{-1}. Depth, temperature and salinity were also measured by a conductivity-temperature-depth (CTD) probe (MicroCAT, Sea-Bird Electronics, Inc., Bellevue, WA, USA), which was mounted on the release gear immediately above the net. CTD data were recorded in real-time by an onboard computer.

Three stations were occupied along 110°E for RMT 1+8 samplings (Fig. 2). Detailed sampling information is given in Table 2.

(3) ORI net

An ORI net, made of nylon bolting cloth with a 335-µm mesh and a mouth ring diameter of 1.6 m, was used for catching meso-to macro-zooplankton (Omori, 1965). The net was deployed off the starboard side of the vessel and towed along the sea surface horizontally at a rate of ca. 1 m s^{-1}. The sampling depth is estimated to have been 0–2 m. The towing time was set to 5–10 minutes according to the degree of mesh clogging by phytoplankton. The volume of water filtered was estimated using a digital mechanical flowmeter (#2030R; GENERAL OCEANICS, Inc., Florida, USA), mounted at the mouth of the net.

ORI net sampling was conducted at three stations along 110°E (Fig. 3). At each station, four

surface tows were performed. Details of the twelve samples are given in Table 3.

(4) NORPAC net

A twin NORPAC standard net, with one net made of nylon bolting cloth with a 335-µm mesh and the other with 100-µm mesh, was used for catching micro- to meso-zooplankton (Motoda, 1957). The net was hauled vertically at a speed of about 1 m s^{-1} from an approximate depth of 150 m. The maximum depth reached was estimated from the wire angle and length of wire paid out. The volume of water filtered through each net was estimated using a calibrated flow-meter (RIGO Co., Ltd., Tokyo, Japan) mounted at the center of the mouth ring of each net.

NORPAC net samplings were conducted at two stations along the 110°E transect (Fig. 4). Sampling information is given in Table 4.

(5) Closing net (‘Gamaguchi net’)

A vertical closing net having a mouth diameter of 0.6m and a nylon bolting cloth with a 63-µm mesh aperture (modified from Kawamura, 1989) was used for catching micro- to meso-zooplankton. The net was towed vertically from the bottom to the top of each designated depth stratum at a speed of 0.5 m s^{-1}. Following closure of the mouth of the net using a messenger, it was brought to the surface at 2 m s^{-1}. The four depth strata involved sampling layers of 0–50, 50–100, 100–200 and 200–500 m. Each sampling layer was estimated from the wire angle and the length of wire paid out. The volume of water filtered was estimated using a calibrated flow-meter (RIGO Co., Ltd., Tokyo, Japan) mounted at the center rod of the mouth ring of the net.

Closing net samplings were conducted at ten stations along 110°E (Fig. 5). Detailed on their 40 sampling information is given in Table 5.

(6) Zooplankton sample processing

All zooplankton samples were immediately preserved in 5% borate-buffered formalin seawater on board and stored in a cool, dark place on the ship.

4. Data policy

The purpose of this data report is to provide information about the collection of zooplankton samples for scientists and students researching Antarctic ecosystems and zooplankton. This report should also make interested researchers aware of the opportunity to use these samples to quantitatively describe zooplankton distribution and biomass in the Southern Ocean. All underlying physical data collected with the CTD and the samples are available for scientific use. We expect the information in this report, in combination with the available samples and environmental data set, to be utilized in various future studies.

Permission to use the data and the preserved samples for publication or presentation should be obtained in writing. Inquiries about details of the data record should be addressed to one of the following:

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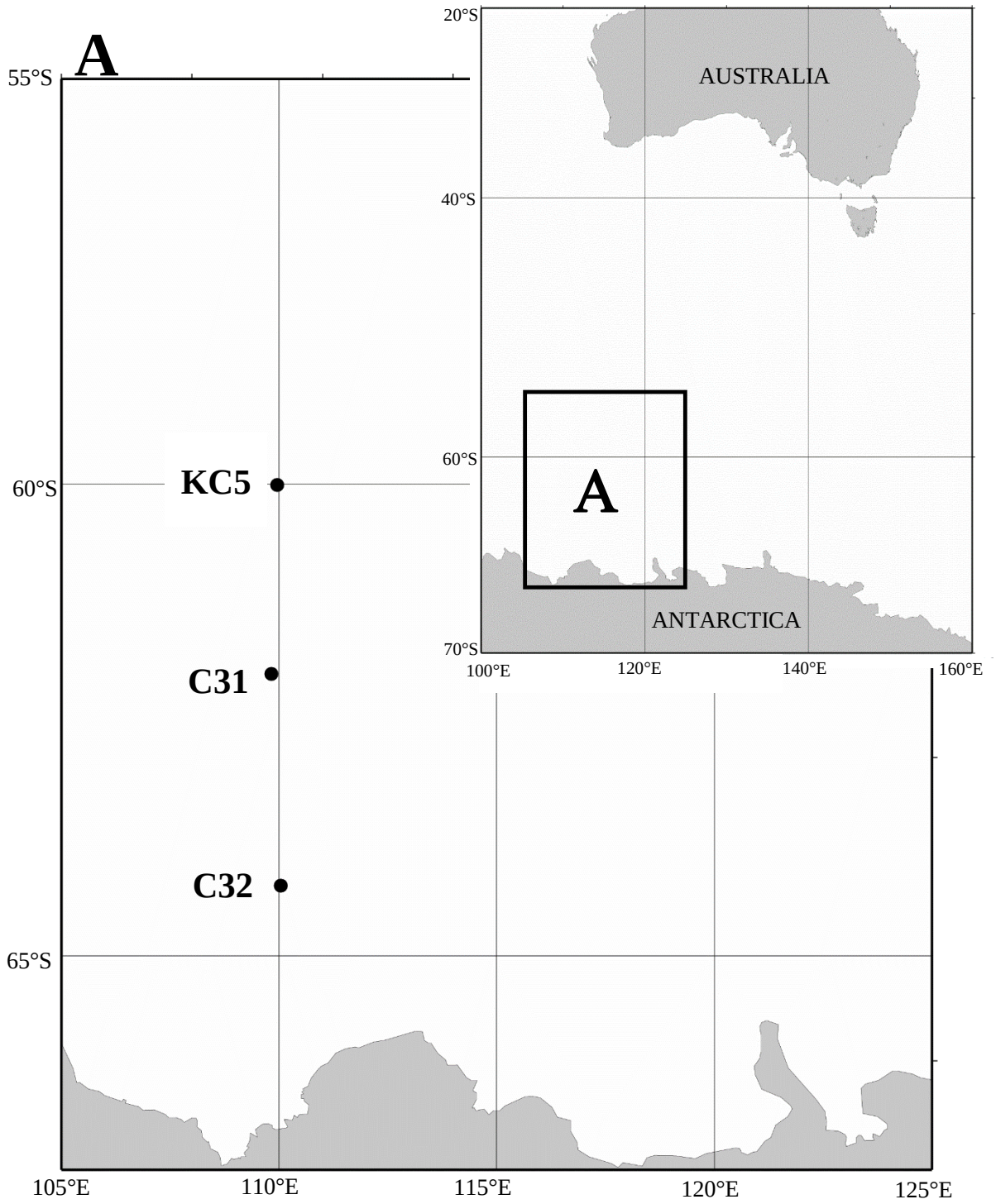

Fig. 1. Stations sampled with IONESS opening/closing multiple-net systems on board the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean, January 2013.

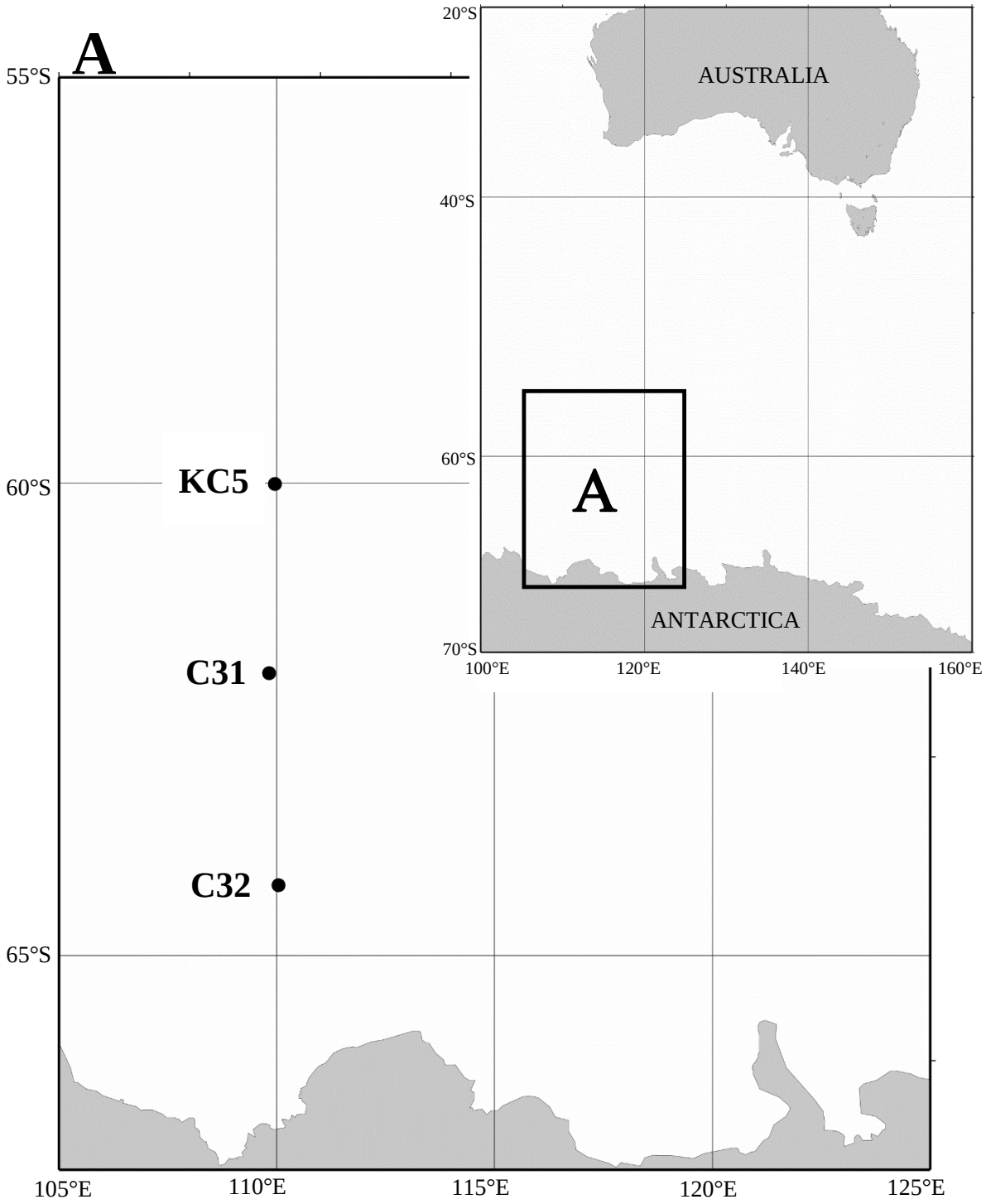

Fig. 2. Stations sampled with RMT 1+8 opening/closing multiple-net systems on board the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean, January 2013.

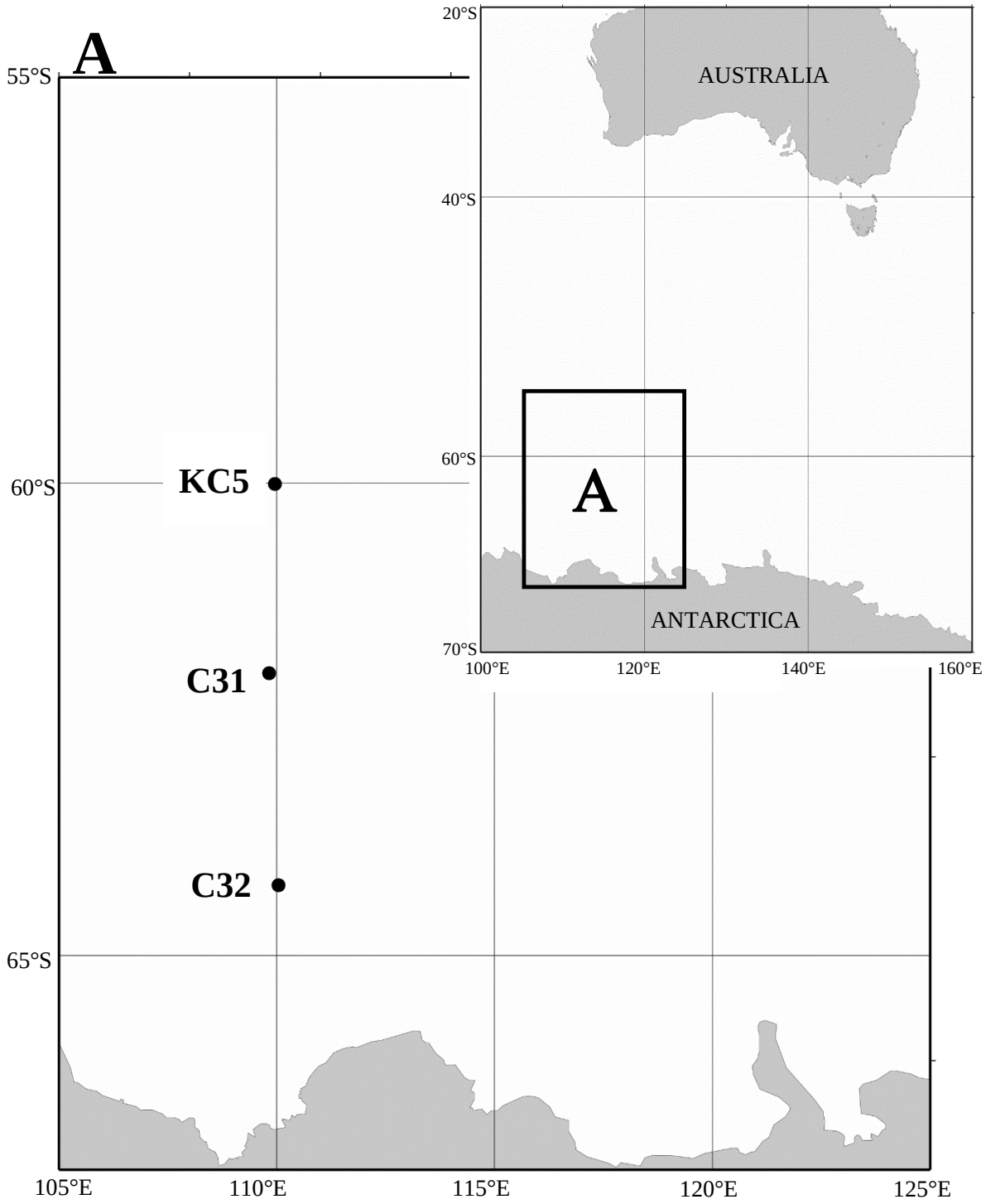

Fig. 3. Stations sampled with an ORI net by surface towing from the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean, January 2013.

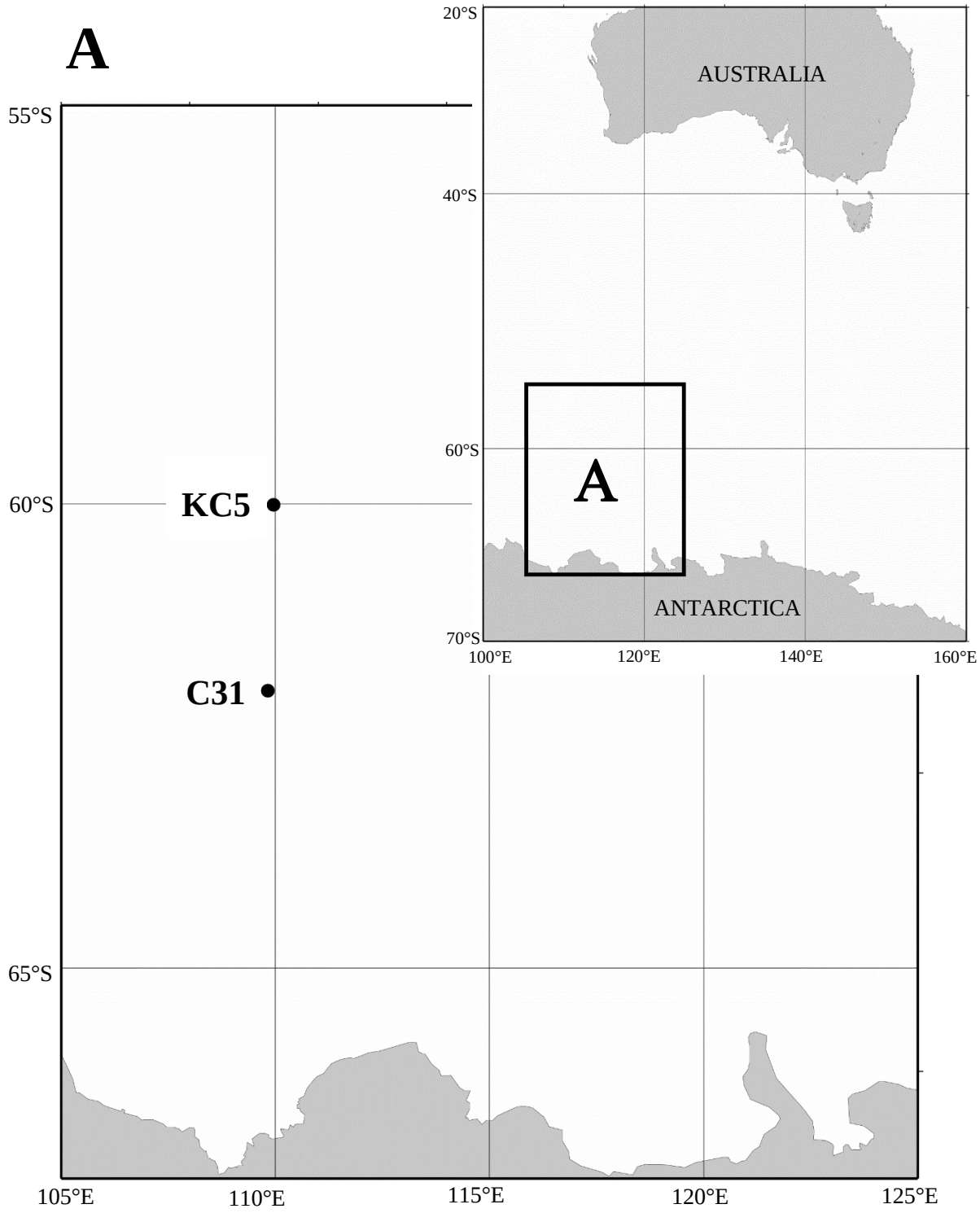

Fig. 4. Stations sampled with a twin NORPAC standard net on board the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean, January 2013.

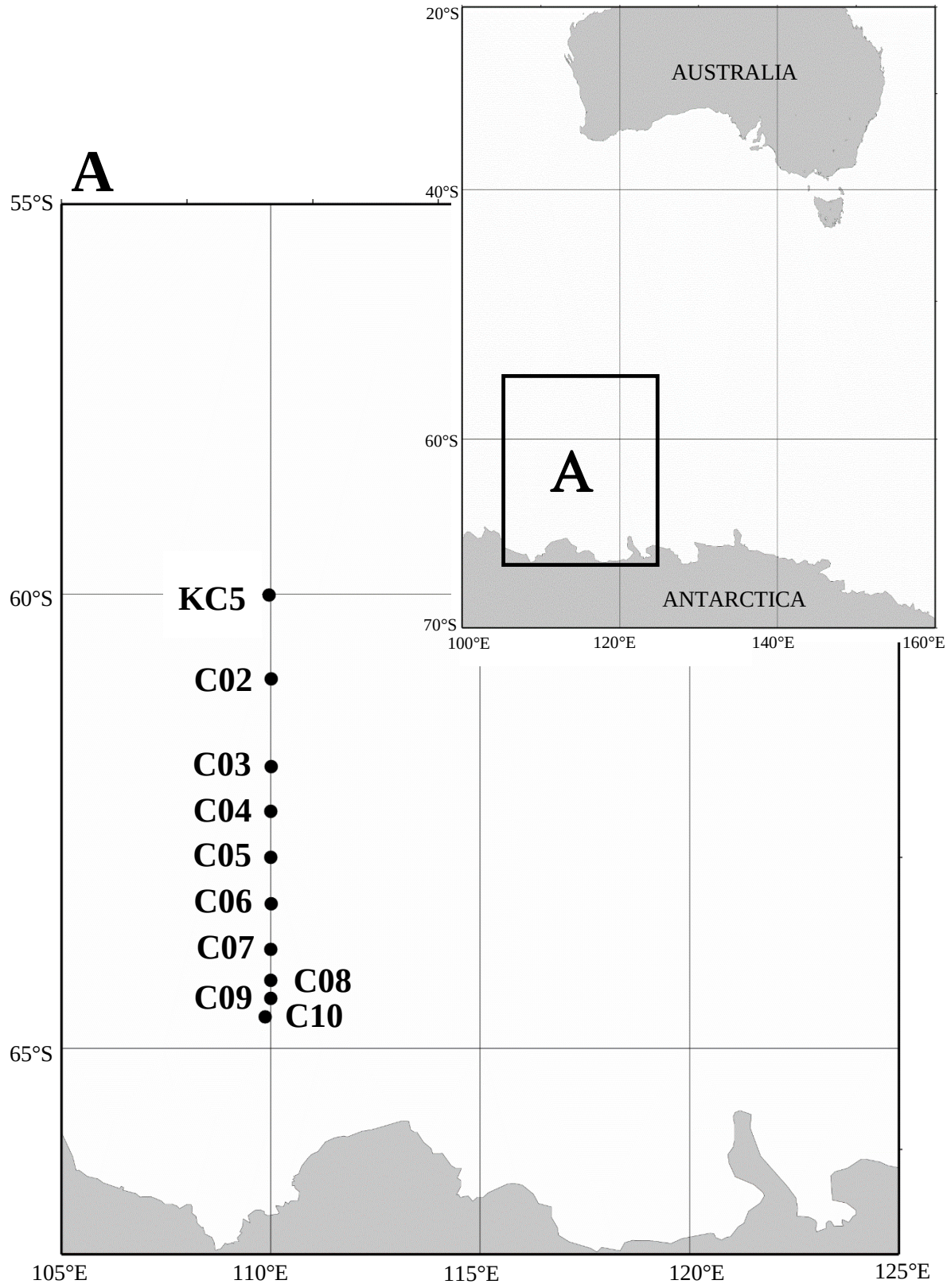

Fig. 5. Stations sampled with a closing net on board the training vessel *Umitaka-maru* in the Indian sector of the Southern Ocean, January 2013.

Table 1. Sampling data of an IONESS along the 110°E transect in the Southern Ocean in January 2013. (1 of 3)

Stn.	Tow	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Net no.[b]	Sampling depth interval (m)	Volume filtered (m^3)
		Start	Finish	Start	Finish				
KC5	1	59 ° 58.70 ´ S	60 ° 2.12 ´ S	2013/01/06 14:24	2013/01/06 19:14	4402	1	3-40	217
		110 ° 7.82 ´ E	109 ° 50.06 ´ E				2	40-80	138
							3	80-120	120
							4	120-160	180
							5	160-200	195
							6	200-250	256
							7	250-300	225
							8	300-400	504
							D	0-400	
							9	1250-1500	732
							D	0-1500	
	2	59 ° 59.90 ´ S	60 ° 2.51 ´ S	2013/01/07 01:50	2013/01/07 07:28	4395	1	3-40	200
		110 ° 0.83 ´ E	109 ° 48.97 ´ E				2	40-80	812
							3	80-120	186
							4	120-160	184
							5	160-200	308
							6	200--250	306
							7	250-300	305
							8	300-400	834
							D	0-400m	
							9	400-500	1006
							10	500-600	675
							11	600-700	839
							12	700-800	744
							13	800-900	781
							14	900-1000	606
							15	1000-1250	1301
							16	1250-1500	1002
							D	400-1500	

[a]Ship mean time = UTC + 8 h
[b]Mesh size, 335 µm; D, down-tow

Table 1. Continued. (2 of 3)

Stn.	Tow	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Net no.[b]	Sampling depth interval (m)	Volume filtered (m^3)
		Start	Finish	Start	Finish				
C32	1	64 ° 20.12 ´ S	64 ° 20.13 ´ S	2013/01/11 01:10	2013/01/11 07:29	3028	1	3-40	689
		109 ° 56.35 ´ E	109 ° 56.79 ´ E				2	40-80	614
							3	80-120	483
							4	120-160	491
							5	160-200	496
							6	200--250	645
							7	250-300	601
							8	300-400	815
							D	0-400m	
							9	400-500	777
							10	500-600	500
							11	600-700	375
							12	700-800	378
							13	800-900	403
							14	900-1000	420
							15	1000-1250	1007
							16	1250-1500	903
							D	400-1500	
	2	64 ° 21.09 ´ S	64 ° 16.09 ´ S	2013/01/11 13:30	2013/01/11 18:28	3078	1	3-40	472
		109 ° 55.30 ´ E	110 ° 9.52 ´ E				2	40-80	291
							3	80-120	380
							4	120-160	643
							5	160-200	443
							6	200--250	383
							7	250-300	576
							8	300-400	1076
							D	0-400m	
							9	400-500	394
							10	500-600	655
							11	600-700	814
							12	700-800	660
							13	800-900	628
							14	900-1000	470
							15	1000-1250	1107
							16	1250-1500	790
							D	400-1500	

[a]Ship mean time = UTC + 8 h
[b]Mesh size, 335 µm; D, down-tow

Table 1. Continued. (3 of 3)

Stn.	Tow	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Net no.[b]	Sampling depth interval (m)	Volume filtered (m^3)
		Start	Finish	Start	Finish				
C31	1	61 ° 59.62 ´ S	61 ° 57.23 ´ S	2013/01/17 01:52	2013/01/17 06:50	4019	1	3-40	480
		110 ° 0.92 ´ E	110 ° 6.03 ´ E				2	40-80	411
							3	80-120	464
							4	120-160	382
							5	160-200	672
							6	200--250	543
							7	250-300	1000
							8	300-400	910
							D	0-400m	
							9	400-500	458
							10	500-600	557
							11	600-700	553
							12	700-800	569
							13	800-900	643
							14	900-1000	630
							15	1000-1250	1044
							16	1250-1500	989
							D	400-1500	
	2	62 ° 0.06 ´ S	61 ° 57.80 ´ S	2013/01/17 13:37	2013/01/17 18:17	4014	1	3-40	383
		109 ° 59.68 ´ E	110 ° 4.68 ´ E				2	40-80	929
							3	80-120	651
							4	120-160	831
							5	160-200	558
							6	200--250	305
							7	250-300	368
							8	300-400	714
							D	0-400m	
							9	400-500	405
							10	500-600	439
							11	600-700	468
							12	700-800	524
							13	800-900	521
							14	900-1000	484
							15	1000-1250	974
							16	1250-1500	1070
							D	400-1500	

[a]Ship mean time = UTC + 8 h

[b]Mesh size, 335 µm; D, down-tow

Table 2. Sampling data of an RMT1+8 along the 110°E transect in the Southern Ocean in January 2013.

Stn.	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Net no.[b]	Sampling depth interval (m)	Volume filtered (m^3)
	Start	Finish	Start	Finish				
KC5	59 ° 59.81 ´ S	60 ° 3.58 ´ S	2013/01/07 09:43	2013/01/07 15:30	4398-4407	1-1	0-50	837
	110 ° 0.64 ´ E	109 ° 41.85 ´ E				8-1	0-50	10502
						1-2	50-100	644
						8-2	50-100	8079
						1-3	100-200	515
						8-3	100-200	6463
						1-4	200-500	515
						8-4	200-500	6463
						1-5	500-1000	966
						8-5	500-1000	12118
						1-6	1000-2000	1417
						8-6	1000-2000	17773
C32	64 ° 16.36 ´ S	64 ° 18.02 ´ S	2013/01/11 19:39	2013/01/12 00:26	3048-3214	1-1	0-50	1030
	110 ° 8.12 ´ E	110 ° 2.16 ´ E				8-1	0-50	12926
						1-2	50-100	902
						8-2	50-100	11310
						1-3	100-200	1030
						8-3	100-200	12926
						1-4	200-500	966
						8-4	200-500	12118
						1-5	500-1000	1288
						8-5	500-1000	16157
						1-6	1000-2000	1610
						8-6	1000-2000	20197
C31	61 ° 59.95 ´ S	61 ° 58.07 ´ S	2013/01/17 20:28	2013/01/18 02:17	4014-4040	1-1	0-50	902
	109 ° 59.71 ´ E	110 ° 4.03 ´ E				8-1	0-50	11310
						1-2	50-100	1095
						8-2	50-100	13734
						1-3	100-200	1095
						8-3	100-200	13734
						1-4	200-500	1610
						8-4	200-500	20197
						1-5	500-1000	2061
						8-5	500-1000	25852
						1-6	1000-2000	2125
						8-6	1000-2000	26660

[a]Ship mean time = UTC + 8 h

[b]Mesh size for 1-m^2 net, 335 μm; mesh size for 8-m^2 net, 4.5 mm

Table 3. Sampling data of an ORI net by surface tows along the 110°E transect in the Southern Ocean in January 2013.

Stn.	No.	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		G.O. Flowmeter revolutions	Volume filtered (m^3)[b]	Remarks
		Start	Finish	Start	Finish			
KC5	1	60 ° 1.42 ´ S 109 ° 53.87 ´ E	60 ° 1.58 ´ S 109 ° 52.99 ´ E	2013/01/07 05:03	2013/01/07 05:12	-	-	Flowmeter revolutions not available.
	2	60 ° 1.91 ´ S 109 ° 51.25 ´ E	60 ° 1.99 ´ S 109 ° 50.77 ´ E	2013/01/07 19:00	2013/01/07 19:05	-	-	Flowmeter revolutions not available.
	3	60 ° 1.39 ´ S 109 ° 53.85 ´ E	60 ° 1.52 ´ S 109 ° 53.26 ´ E	2013/01/07 22:03	2013/01/07 22:15	20012	1081	
	4	60 ° 2.37 ´ S 109 ° 49.68 ´ E	60 ° 2.42 ´ S 109 ° 49.42 ´ E	2013/01/07 23:14	2013/01/07 23:22	9003	486	
C32	1	64 ° 18.17 ´ S 110 ° 8.33 ´ E	64 ° 18.28 ´ S 110 ° 7.70 ´ E	2013/01/11 05:00	2013/01/11 05:10	23090	1248	
	2	64 ° 20.29 ´ S 109 ° 55.86 ´ E	64 ° 20.44 ´ S 109 ° 55.01 ´ E	2013/01/11 08:40	2013/01/11 08:50	26000	1405	
	3	64 ° 18.03 ´ S 110 ° 4.51 ´ E	64 ° 17.82 ´ S 110 ° 5.08 ´ E	2013/01/11 17:01	2013/01/11 17:11	21292	1150	
	4	64 ° 15.72 ´ S 110 ° 10.05 ´ E	64 ° 16.01 ´ S 110 ° 9.20 ´ E	2013/01/11 18:48	2013/01/11 18:58	27154	1467	
C31	1	61 ° 55.56 ´ S 110 ° 11.50 ´ E	61 ° 55.67 ´ S 110 ° 11.06 ´ E	2013/01/17 05:23	2013/01/17 05:28	8929	482	
	2	61 ° 57.52 ´ S 110 ° 9.41 ´ E	61 ° 57.71 ´ S 110 ° 4.73 ´ E	2013/01/17 07:03	2013/01/17 07:08	9181	496	
	3	61 ° 56.43 ´ S 110 ° 9.41 ´ E	61 ° 56.55 ´ S 110 ° 8.94 ´ E	2013/01/17 17:00	2013/01/17 17:05	6479	350	
	4	61 ° 58.10 ´ S 110 ° 4.16 ´ E	61 ° 58.30 ´ S 110 ° 3.69 ´ E	2013/01/17 18:28	2013/01/17 18:33	8539	461	

[a]Ship mean time = UTC + 8 h

[b]Mesh size, 335 µm

Table 4. Sampling data of a twin NORPAC standard net along the 110°E transect in the Southern Ocean in January 2013.

No.	Stn.	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Wire length (m)	Wire angle (°)	Estimated depth of haul (m)	Flow meter		Volume filtered (m^3)	Mesh size (μm)	Remarks
		Start	Finish	Start	Finish				ID. no.	Revolutions			
1	KC5	59 ° 59.93 ´ S	59 ° 59.92 ´ S	2013/01/06 20:20	2013/01/06 20:27	150	0	150	3765	1191	15.90	100	
		110 ° 0.24 ´ E	110 ° 0.31 ´ E						3616	1673	24.71	335	
2	C31	62 ° 0.03 ´ S	62 ° 0.04 ´ S	2013/01/17 01:03	2013/01/17 01:14	151	5	150	3765	1433	19.14	100	
		109 ° 0.03 ´ E	109 ° 59.38 ´ E						3616	1619	23.91	335	

[a]Ship mean time = UTC + 8 h

Table 5. Sampling data of a closing net along the 110°E in the Southern Ocean in January 2013. (1 of 2)

Stn.	No.	Position				Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Wire length (m)		Wire angle (°)		Sampling depth interval (m)	Flow meter		Volume filtered (m^3)[b]	Remarks
		Start		Finish		Start	Finish		Start	Finish	Start	Finish		ID. no.	Revolutions		
KC5	1	59 °	59.94 ´ S	59 °	59.94 ´ S	2013/01/06 21:00	2013/01/06 23:11	4407	50	-	0	-	0-50	3294	490	11.80	
	2	110 °	0.36 ´ E	110 °	0.29 ´ E				101	50	8	0	50-100	3294	-	-	Flowmeter revolutions not
	3								200	100	0	0	100-200	3294	167	4.02	
	4								500	200	0	3	200-500	3294	4020	96.78	
C02	5	60 °	59.94 ´ S	60 °	59.94 ´ S	2013/01/07 21:33	2013/01/08 00:25	4284	53	-	18	-	0-50	3294	672	16.18	
	6	110 °	0.30 ´ E	110 °	0.36 ´ E				100	50	3	13	49-100	3294	1188	28.60	
	7								201	100	6	6	99-200	3294	2210	53.21	
	8								508	200	10	0	200-500	3294	1065	25.64	
C03	9	62 °	0.00 ´ S	62 °	0.06 ´ S	2013/01/08 08:17	2013/01/08 10:58	4011	50	0	0	-	0-50	3294	430	10.35	
	10	110 °	0.42 ´ E	110 °	0.07 ´ E				101	50	4	0	50-100	3294	1612	38.81	
	11								203	100	10	2	100-200	3294	1310	31.54	
	12								501	200	4	3	200-500	3294	3150	75.84	
C04	15	62 °	29.94 ´ S	62 °	29.94 ´ S	2013/01/08 15:59	2013/01/08 18:08	3780	50	0	4	-	0-50	3294	880	21.19	
	14	110 °	0.18 ´ E	110 °	0.17 ´ E				101	50	8	0	50-100	3294	1070	25.76	
	15								200	100	2	13	97-200	3294	1340	32.26	
	16								511	200	12	14	194-500	3294	3875	93.29	
C05	17	63 °	0.00 ´ S	63 °	0.06 ´ S	2013/01/08 23:01	2013/01/09 01:39	3903	52	0	16	-	0-50	3294	517	12.45	
	18	110 °	0.06 ´ E	109 °	59.84 ´ E				102	50	10	6	50-100	3294	675	16.25	
	19								206	100	14	16	96-200	3294	1142	27.49	
	20								505	200	8	6	199-500	3294	2560	61.63	
C06	21	63 °	30.00 ´ S	63 °	30.00 ´ S	2013/01/09 05:50	2013/01/09 07:50	3681	51	0	10	-	0-50	3294	418	10.06	
	22	110 °	0.24 ´ E	110 °	0.59 ´ E				101	50	5	15	48-100	3294	465	11.20	
	23								201	100	5	4	100-200	3294	820	19.74	
	24								501	200	4	15	193-500	3294	1845	44.42	

[a]Ship mean time = UTC + 8 h

[b]Mesh size, 63 μm

Table 5. Continued. (2 of 2)

Stn.	No.	Position		Date (yyyy/mm/dd) & Time (UTC)[a]		Bottom depth (m)	Wire length (m)		Wire angle (°)		Sampling depth interval (m)	Flow meter		Volume filtered (m^3)[b]	Remarks
		Start	Finish	Start	Finish		Start	Finish	Start	Finish		ID. no.	Revolutions		
C07	25	63 ° 59.04 ´ S	63 ° 59.04 ´ S	2013/01/09 12:05	2013/01/09 14:16	3399	50	0	3	-	0-50	3294	383	9.22	
	26	110 ° 0.12 ´ E	109 ° 59.91 ´ E				100	50	4	0	50-100	3294	329	7.92	
	27						200	100	3	6	99-200	3294	689	16.59	
	28						500	200	2	8	198-500	3294	2830	68.13	
C08	29	64 ° 18.24 ´ S	64 ° 18.36 ´ S	2013/01/09 17:48	2013/01/09 19:35	3045	50	0	2	-	0-50	3294	238	5.73	
	30	110 ° 0.12 ´ E	110 ° 0.06 ´ E				101	50	6	5	50-100	3294	254	6.12	
	31						200	100	1	3	100-200	3294	589	14.18	
	32						503	200	6	0	200-500	3294	1657	39.89	
C09	33	64 ° 29.58 ´ S	64 ° 29.88 ´ S	2013/01/12 03:43	2103/01/12 05:35	2866	50	0	8	-	0-50	3294	322	7.75	
	34	109 ° 59.76 ´ E	109 ° 59.68 ´ E				100	50	0	2	50-100	3294	382	9.20	
	35						200	100	1	8	99-200	3294	519	12.50	
	36						500	200	1	10	197-500	3294	1520	36.59	
C10	37	64 ° 40.86 ´ S	64 ° 40.92 ´ S	2013/01/12 08:06	2013/01/12 10:05	2887	50	0	2	-	0-50	3294	229	5.51	
	38	109 ° 51.78 ´ E	109 ° 51.75 ´ E				100	50	3	1	50-100	3294	290	6.98	
	39						200	100	2	0	100-200	3294	488	11.75	
	40						500	200	2	6	199-500	3294	1418	34.14	

[a]Ship mean time = UTC + 8 h

[b]Mesh size, 63 µm